

Massachusetts Urban Forestry Program

The Citizen Forester

July, 2008 No. 127

This month's lead article first appeared in the Spring 08 edition of *California Trees* a news letter of California ReLeaf. To view the article in its entirety with photos and informative sidebars go to: www.californiareleaf.org and look under programs.

Planting Trees To Fight Global Climate Change

By *Kelaine Vargas*

Increasing levels of carbon dioxide and other greenhouse gases in the atmosphere are of growing concern globally and locally, and California has pledged to be a forerunner in the fight against global climate change by reducing emissions to 1990 levels by 2020. Many of us would like to help but aren't sure what to do. Strategies at the personal scale range from the mundane (using compact fluorescent light bulbs) to the expensive (switching to a hybrid car) to the smelly (converting french fry grease into diesel fuel). All have some disadvantages. But there is one solution sure to appeal to readers of this newsletter, who are likely to find it a strategy without a flaw: we can plant trees.

The Role of Trees

Why trees? Trees have one big advantage compared to all other methods of addressing global warming: they actually remove greenhouse gases from the atmosphere. Most existing strategies and plans for the future work to reduce the amount of carbon dioxide and other gases being produced without addressing the already high levels that currently exist. Trees, however, take carbon dioxide from the air and transform it into living matter—branches, trunks, leaves, flowers, and roots. A large tree can remove and store several tons of greenhouse gases over a lifetime. At the same time, urban trees have a second, equally important advantage. Trees help moderate air temperatures and thereby reduce our need to burn fossil fuels to produce energy for air conditioning and heating. Every kilowatt-hour of electricity or therm of natural gas reduced means less carbon dioxide in the atmosphere (and also fewer air pollutants, less wasted water, and lower energy bills). A judiciously placed large tree in California's San Joaquin Valley can reduce carbon dioxide emissions from energy production by another several tons over its lifetime.

Maximizing Greenhouse Gas Sequestration

Every tree planted works to sequester greenhouse gases, but some do more work than others. How can we maximize the amount of carbon dioxide trapped by the trees?

Bigger is better: If trees reduce atmospheric levels of greenhouse gases by transforming the gases into living matter, it stands to reason that the bigger a tree is the more carbon it is storing. In central California, a large evergreen oak will have sequestered nearly nine tons of carbon dioxide after 50 years, while a Bradford pear will sequester only about a quarter as much. To maximize carbon storage, plant as large a tree as possible.

Remember, though, that large trees require a lot of space both above and below ground to reach their full potential. The only thing that makes a bonsai tree so small is that its growing space has been artificially constricted. When selecting the species, match the tree's mature size to the space available, consider the soil volume necessary to achieve full growth, and note any overhead or underground obstacles, such as power lines, sidewalks, curbs, roads, and water pipes, that will stunt tree growth or require pruning of branches and roots.

Longevity is important: The carbon dioxide that is stored in a tree only remains trapped as long as the tree is alive. Once the tree dies and begins to decompose, the greenhouse gases it has sequestered will return to the atmosphere. Trees that live longer, therefore, do more to combat climate change than shorter-lived trees. The evergreen oak mentioned above will not only have captured four times as much carbon dioxide after only 50 years, but because it will outlive the Bradford pear by decades or even centuries, its climate change benefit is even greater. A tree's longevity isn't only dependent on the species, but also on the individual tree's health. Maximize tree health by selecting a species that is well-suited to the site, matching the species' water needs to the amount of water available, considering potential pests and diseases, and noting potential conflicts with infrastructure that will require substantial pruning of branches or roots that can weaken the tree. Early care and proper pruning, especially in the first few years, are also important to ensure future health. Have your new tree inspected and, if necessary, pruned each year by a certified arborist for the first five years to set it on the right course for the future. Afterwards, inspection and pruning every 6 to 8 years will keep it healthy and strong. Finding a long-term use for the wood of a dead or dying tree can extend the climate change benefits it provides by slowing the decay process. Most urban wood is chipped for mulch or is sent directly to a landfill and decays within a few years. Some California cities like Sacramento and Lompoc, however, are recycling trees to create plaques, fences, benches, tables and other furniture, extending climate benefits by as much as 50 years. There is also a small but growing market for specialty wood products made from urban trees. For more information on reusing urban wood, see the Urban Forest Ecosystem Institute's Urban Wood Web page: www.ufei.org/urbanwood/index.html.

Maximizing Energy Conservation

Trees planted near buildings have a two-fold beneficial effect on our energy use: they lower temperatures by directly providing shade and they have a moderating influence on the overall urban climate when they transpire water. A recent study by NASA and Columbia University found that trees that shade paved or other manmade surfaces provide the "greatest cooling potential per unit area" for reducing the urban heat island effect. Trees planted in the right places can have a significant impact on our energy consumption and a significant impact on the amount of carbon dioxide (and air pollutants like sulfur dioxide and ozone-forming compounds) that is released when energy is produced. At the same time, a poorly sited tree can have the opposite impact—increasing our heating use by blocking winter sun. How can we maximize energy conservation with trees?

West is best: Concentrate first on planting trees on the west and then on the east sides of buildings. This will provide cooling shade for walls and windows on the sides of the house that the sun warms most strongly. Avoid planting evergreen or solar-unfriendly trees (those with dense branching patterns or that retain dead leaves in the winter) on the southern sides of houses as these will block the warming rays of the winter sun and increase energy use for heating. A large mature evergreen tree on the west side of a house

in the San Joaquin Valley can reduce energy consumption by up to 323 kWh and carbon dioxide production by up to 290 lbs annually! The same tree planted on the south side of the house will have a smaller cooling benefit (283 kWh) and will slightly increase energy use for winter heating (13.4 therms).

Size, type and form: When choosing a tree, the most significant factor to consider for maximizing energy benefits is tree size. Big trees with large amounts of leaf surface area provide the most shade and the greatest climate moderation effects. Where aboveground space is limited, plant species such as elms, plane trees, oaks, and zelkovas can be pruned to arch over homes as they grow or evergreen trees such as redwoods whose lower branches can be raised. Drought-tolerant species also help reduce energy use by reducing the amount of water used. About one-fifth of California's electricity and one-third of our natural gas is used to move, clean, and distribute water, so the less water we use, the less energy is wasted. This is especially true in southern California, where conveying water from its distant source to local treatment facilities requires about 60 times more energy than in northern California.

Energy Efficient Tree Maintenance

Once you have selected the most appropriate, biggest, longest-lived tree for your site, and have cared for it carefully, what more can you do? You can increase the climate-change benefits of the tree further by being mindful of the greenhouse gases produced during tree maintenance. Hire a landscape company or arborist who doesn't have far to travel, or organize their services with your neighbors to minimize trips to your neighborhood. Rake leaves instead of using a leaf blower and compost tree cuttings to create your own mulch on site. Trees, of course, won't solve all of our climate change problems, but they are a step in the right direction that all of us can take. And remember that the tree you plant to help reduce global warming will also clean the air, filter stormwater, lower your energy bill, provide a habitat for local wildlife, and beautify your neighborhood—that's a claim no compact fluorescent light bulb can make!

Kelaine Vargas is an Urban Ecologist for the USDA Forest Service at the Center for Urban Forest Research in Davis California www.fs.fed.us/psw/programs/cufr

Picks and Shovels

For more related information

California ReLeaf founded in 1989 and incorporated as a 501(c)(3) nonprofit organization in 2004. Its mission: to empower grassroots efforts and build strategic partnerships that preserve, protect, and enhance California's urban and community forests. www.californiareleaf.org

The US Forest Service Urban and Community Forestry Program provides technical, financial, educational, and research services to states, cities, and nonprofit groups so they can plant, protect, maintain, and utilize wood from community trees and forests to maximize environmental, social and economic benefits.

www.na.fs.fed.us/urban/index.shtm

The Urban Natural Resources Institute (UNRI) a science based resource for information and the answers to questions on the management of urban and community forestry resources. With the goal of strengthening public awareness of activities related to urban natural resources, research and management. www.unri.org

Urban Forestry and Carbon Dioxide Reduction – the science: Read the comprehensive study titled, *“Carbon dioxide reduction through urban forestry: guidelines for professional and volunteer tree planters,”* at <http://www.treesearch.fs.fed.us/pubs/6779>

Growing Greener

Town of Norton

Used a National Grid Partnership Grant with DCR to plant sixteen trees on and around the town common, which is part of a historical district in town. Many aging trees in the area of the common were removed as part of a National Grid Augmented Clearance for Trees Program (ACT) which provided the grant money for the new tree plantings. Tree Warden Michael J. Tierny worked with the Highway Superintendent, the Town Common Committee and the Historic Commission to site and replace trees and will be monitoring the health and maintenance of the new trees to ensure a successful planting.

Growing on Trees

Concrete reduces rain runoff a short news piece from CNN on Chicago’s use of permeable surfaces to reduce stormwater runoff and subsequent polluting of Lake Michigan www.cnn.com/video/?/video/tech/2008/06/25/obrien.green.concrete.cnn

Townboard.org: the one-stop calendar site for Massachusetts town boards founded on September 1, 1999 to provide each of the Commonwealth's 351 cities and towns with up-to-date information on relevant training and educational opportunities in the state and region - particularly on land-use issues. www.townboard.org

State and Private Forestry Redesign Web page: The purpose of a new approach to State and Private Forestry is to shape and influence forest land use on a scale, and in a way, that optimizes public benefits from trees and forests for both current and future generations. Find the latest information at www.fs.fed.us/spf/redesign/index.shtml

Conference of Mayors Climate Protection Center Web Site: Find the latest information on climate change policy by the Conference of Mayors www.usmayors.org/climateprotection/agreement.htm.

On The Horizon

Urban Heat Island Research in New York State July 16, 2008 at 10:00 a.m. Central / 11:00 Eastern. UNRI Webcast - www.unri.org/webcasts

Trees and Transportation July 17, 2008 Noon Central / 1:00 p.m. Eastern Pamela Helfer, Field Coordinator, Trees Forever (Marion, IA) Dorothy McDaniel, Executive Director, Trees Columbus (Columbus, GA) ACT Webcast - http://actrees.org/site/stories/act_webcast_series.php

The Great Ideas Summer Conference: July 23, 2008 The Crane Estate, Ipswich, MA Join Massachusetts' largest green industry associations - MFGA and MNLA - for their fifth annual collaborative event, the 2008 Summer Meeting and Trade Show at one of the region's most scenic, historically important and ecologically diverse landscapes...The Crane Estate. For more information go to www.mnla.com

Live Webinar: Thursday July 24, 2008 11am-12-noon EST. NCDC Imaging and Digital Globe, Inc. Will focus on urban forestry, it will also highlight case studies and solutions for the following industries: Water Conservation, Air Quality, Stormwater, Watershed Management, Natural Resources, GIS and Utilities. For registration information go to www.ncdcimaging.com/webinarutc

Mississippi Urban Forest Council's 18th Annual Conference, Green Infrastructure and Urban Forestry: July 22- 24, 2008 Jackie Dole Sherrill Community Center Hattiesburg, Mississippi. Focusing this year on creating sustainable green infrastructure in your community The conference will feature industry experts who will share their knowledge and life experiences with trees and development, especially in urban areas and business districts. For registration information go to the MS. U&CF web page www.mfc.state.ms.us/u&cf.htm

New England Wild Flower Society's Nasami Farm's Open House, free weekly lecture/demonstrations at Nasami Farm, the Society's native plant nursery, 128 North Street, Whately, MA. 413-397-9922. www.newenglandWILD.org

Two Day Workshop on Tree Climbing, Fall Protection & Work Positioning: at the Dana L. Thompson Park, Manchester Vermont August 18 & 19, 2008 8:30 – 3:30 pm Targeted audience are inexperienced climbers and/or climbers who have considerable past experience, but are not up to date on current safety issues, legislation, techniques and equipment. For registration information visit the Vermont's Community Forestry Programs web page at: www.vtcommunityforestry.org

Species Spotlight

Ptelea trifoliata

Hoptree, Wafer-ash

Hardiness Zone 3

General Description: Considered a small deciduous tree or large shrub, native to South Eastern coastal environments of United States. Relatively slow growth rate reaching 15' – 20' tall usually in a multi stemmed habit that forms a dense rounded crown with a medium texture. The shiny dark green leaves are 2.5" – 5" long alternately arranged and pinnately compound, trifoliate with the middle leaflet being the largest and turning yellow-green in fall. Leaflets are ovate to elliptical with entire margins or with minor serrations and are pungent when crushed. Flowers are greenish-white, fragrant borne in terminal corymbs 2"- 3" in diameter in early June. Fruit are persistent circular winged samara 1" in diameter green in color changing to brown. Bark is a dark gray with warty protrusions with stems of reddish brown.



Culture: Prefers moist well drained soils and can tolerate full sun or shade.

Landscape Use's: Naturalized areas, plant for the fragrant flowers, as a specimen or groupings.

Liabilities: No serious pests, minor leaf spot, rust or spider mite damage

Cultivars/Varieties; Not commonly found in nurseries but are available, **subsp. *polyadenia*** - Normally found in the mountains, this variant grows lower into a shrub. It features heavy fruit production. '**Aurea**' - This is a yellow-leaved form with bright gold young leaves that fade to light yellow-green by the middle of summer. '**Glauca**' - A distinct departure from the species, this selection offers blue-green foliage.

For more information, see www.hort.uconn.edu/plants/p/ptetri/ptetri1.html

The Citizen Forester is made possible through a grant from the USDA Forest Service Urban and Community Forestry Program and the Massachusetts Department of Conservation and Recreation, Bureau of Forestry.

Subscribe? Unsubscribe?

You are receiving this email because you have requested to receive the Citizen Forester. If this is an error or you do not wish to receive this newsletter, please email eric.seaborn@state.ma.us

If you have a topic or addition to the Citizen Forester newsletter, please let us know.

If you have questions about Urban and Community Forestry, contact:



Eric Seaborn, Coordinator (eric.seaborn@state.ma.us)

Alan Snow Community Forester, Central & Western Mass
alan.snow@state.ma.us

Bureau of Forestry
Department of Conservation and Recreation
251 Causeway Street, Suite 900
Boston, MA 02114

Deval Patrick, Governor

Timothy Murray, Lieutenant Governor

Ian Bowles, Secretary, Executive Office of Energy and Environmental Affairs

Rick Sullivan, Commissioner, Department of Conservation and Recreation

Jim DiMaio, Chief, Bureaus of Forest Fire Control and Forestry